Subsequent investigation proved that the ice and snow flora was richer than had been anticipated. Dr. Kjellman found at Spitzbergen not only "red snow," but "green snow." Some of the "material" was brought home in a dry state; on being afterwards examined, it was found to contain above a dozen other plants, some of which were of a class even lower than "red snow"; others belonged to plants of higher organisation. Mosses also in the protonemata state were met with, but of very diminutive size. The ice and snow vegetation of this and other localities is described in detail. Special interest invests the kryokonit[1] with which all the specimens from South Greenland were mixed, because it was found to contain a number of germinating spores of *Sphærella nivalis*. During the winter of 1880-81 Prof. Wittrock was fortunate enough to enable some of these spores to develop themselves, hence it was considered that they were resting spores. They endure, without taking any harm, to be during the greater part of the year, frozen up in the ice and snow of the Arctic regions, and also to be dried up for some months by the heat of the sun. The author's observations on the conditions of plant life in the Arctic regions and on the glaciers of high northern tracts are particularly interesting. He observes that these tracts are certainly not entirely deprived of the powerful and life-giving influence of the sun's rays. They are, it is true, during a great part of the year (in winter) enveloped in continual darkness and gloom; but at another period (in summer) they are in the enjoyment of perpetual light. During this period the sun's rays, although oblique, may exercise a powerful influence. At midday the heat may be surprisingly strong. Nordenskjöld found that the warmth of the air a short distance above the surface of the ice at midday in July rose to 25°-30° of Celsius. It is evident that a great melting would take place on the surface of the glaciers and snow-fields. There is then formed a layer of snowy and icy water, which, though not much above the zero of Celsius, is enough to satisfy the demands for warmth of this portion of the simplest organisations of the vegetable kingdom. That they thrive under these hard conditions of life is evident from the immense multitudes in which they occur. "Probably," adds the author, "there is no other species on earth which is richer in individuals than red snow."

Prof. Wittrock gives a full description of the structure and fructification of these minute plants; then follows a summary of their characteristics. The latter may be thus briefly stated:—The flora of the ice- and snow-fields consists almost entirely of algæ of microscopical size and of extremely low organisation; the greater part of the plants are unicellular; they are sometimes solitary, sometimes in colonies. The fructification is very simple, asexual, and of one kind only. These algæ are generally of bright and full colours. The "snow-flower" is blood-red, *Ancylonema Nordenskjöldii* purplish-brown; many Conferveæ and Desmidieæ are bright green. The land vegetation is represented entirely by mosses, which appear to be nearly in the same low state of development as the algæ.

The orders, families, genera, and species of which the Arctic flora is composed are well arranged in tabular form at pp. 112, 113. In this table the flora of the snow is distinguished from that of the ice. It will be seen that the most common plant is "red snow;" the next in frequency is *Ancylonema Nordenskjöldii*. The snow flora is richer than that of the ice. The former includes thirty-seven species; the latter ten only. The mosses and Conferveæ belong exclusively to the snow flora. Ancylonema is the only plant which is limited entirely to the ice flora. Of Phycochromophyceæ the ice flora has two species only, while that of the snow possesses ten. The snow flora of Spitzbergen is rich in Conferveæ, that of Lapland in Desmidieæ. In the middle north the Phycochroms prevail. It is stated that *Bacteria termo* is occasionally found within the limits of the ice and snow flora. *Chytridium hæmatococci* may also, observes the author, belong to the Arctic flora, as it was found parasitic on *Sph. nivalis* on the Berner glacier in Switzerland.

It appears that the Arctic regions possess a microscopic fauna as well as flora. The limits of this notice will only permit a reference to p. 116, where the small animals of which this fauna consists are described. One fact connected with these little creatures may be mentioned. With the object of a further study of the algæ, Prof. Wittrock put a portion of the dried material brought from Spitzbergen into distilled water. He found that not only the algæ came to life again, a fact which he had before observed with respect to red snow, but what was more astonishing, even the little worms revived, and ate a great deal of food, which could be distinguished under the microscope as the reddish-yellow contents of the intestinal canal of these transparent, colourless creatures.

The work is illustrated by two woodcuts and by five lithographic plates, one of which contains figures from drawings by Prof. Wittrock of some of the plants; the others consist of views from drawings by Dr. Berggren, of the inland ice of Greenland, representing localities from whence portions of the material containing the ice and snow flora were obtained.[1] The view of the intermittent spring which the travellers met with about 45 kilomètres from the coast, and which, bursting from a cleft in the ice, throws up a jet of water to a great height, is of special interest from the indications it gives of the probable existence of warm conditions in the interior of Greenland. It will be observed that the "sky-line" of the distance in some of the views shows an undulating outline, suggesting a hilly country in the interior.

MARY P. MERRIFIELD

NOTES

THE Lords of the Committee of Council on Education have, by a recent minute, decided to withdraw the prizes hitherto given to candidates in the Science Examinations who obtain a first class in the elementary stage of the various subjects of science, substituting certificates of merit, and retaining only the prizes given in the advanced stage. The money hitherto devoted to prizes will be employed in providing thirty-six National Scholarships—twelve each year—which will be offered in competition to students of the industrial classes, and awarded at the annual examinations of the department. The National Scholarship will be tenable, at the option of the holder, either at the Normal School of Science, South Kensington, or at the Royal College of Science, Dublin, during the course for the Associateship—about three years. The scholar will receive 30*s*. a week during the session of about nine months in the year, second-class railway fare to and from London or Dublin, and free admission to the lectures and laboratories. This is a most important step in advance.

WE have already announced that the Thirty-second Annual Meeting of the American Association for the Advancement of Science will be held at Minneapolis, Minnesota, from August 15-21 next. A Local Committee has also been formed to carry out the arrangements at Minneapolis, and members expecting to attend the meeting are requested to send a notification to that effect to its secretary, Prof. H. N. Wurchell, Minneapolis, without delay. Full titles of all the papers to be read at the meetings must be forwarded to the permanent secretary as early as possible, accompanied by an abstract of their contents and a statement of the time which they will occupy in delivery. By the kindness of a member, provision will be made for the illustration of papers by means of a lantern if the authors bring their slides to the meeting. Altogether the arrangements are very complete, and a cordial welcome will, we doubt not, be given to any foreign members or visitors who are making arrangements to attend this meeting of the American Association.

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[1] Analyses of kryokonit will be found at pp. 95, 96.

[1] Those who are interested in these algæ may like to know that specimens of fourteen of them are included in the Fasciculi of dried freshwater algæ distributed by Prof. Wittrock and Dr. Otto Nordstedt, of which ten parts have already appeared. The 11th fasciculus, containing other portions of the Arctic flora, will shortly be issued at Lund, Upsal, and Stockholm, under the following title:—"Algæ aquæ dulcis exsiccatæ præcipue Scandinavicæ quas adjectis algis marinis chlorophyllaceis et phycochromaceis distribuerunt Veit Wittrock et Otto Nordstedt."

THE Council of the Yorkshire College announce that the Cavendish Professorship of Physics has been established as a memorial to the first President of the College, the late Lord Frederick Charles Cavendish, M.P. The fund required to endow this chair was 7500*l.*, and 7560*l.* 13*s.* has been contributed. Prof. Rücker retains the position he has occupied with much distinction from the foundation of the Yorkshire College, as Professor of Physics, but his title will in future be "Cavendish Professor of Physics."

DR. CARGILL G. KNOTT, F.R.S.E., Secretary of the Edinburgh Mathematical Society, has been recently appointed Professor of Physics in the Imperial University of Tokio, Japan.

ENGLISH chemists may be interested to learn that an election to fill the Chair of Chemistry, including General and Industrial Chemistry, in the University of Virginia, vacant by the resignation of the present incumbent (J. W. Mallet, Ph.D., F.R.S.), will be held by the Board of Visitors of the University of Virginia, on September 11, 1883. The salary of the professor is 3000 dollars, with a commodious house, rent free. Applications, with testimonials, must be addressed to "The Rector and Visitors," P.O. University of Virginia, Albemarle County, Va. We understand the Chair is open to English competitors.

WE regret to announce the death, at the early age of thirty-seven years, of Mrs. Chaplin Ayrton, the wife of Prof. W. E. Ayrton. Mrs. Ayrton was in many ways a remarkable woman. As Miss Chaplin she was one of the first to take up the practical question of women's professional education, and it is in part due to her exertions that the medical career is now opened to women. Her long struggle, from 1869 to 1873, to obtain the necessary permission to present herself for examination told seriously on her health. In addition to attending all the medical classes open to women in Edinburgh, and gaining honours at all the examinations held in connection with them, Mrs. Chaplin Ayrton studied at the hospitals and the Medical School of Paris, and there took her degree of M.D. in 1879. Her graduation theses, "Researches on the General Dimensions and on the Development of the Body among the Japanese," is full of valuable scientific experiments.

THE Queen has been pleased to confer Baronetcies upon Dr. Andrew Clark and Mr. Prescott Hewett.

A BLUE-BOOK just issued contains reports on the mineral wealth of Corea. The explorers found numerous veins of iron, copper, lead, and also some gold. These were worked in the rough native fashion, and it is noticeable that no indications of coal were found. In twenty days' journey ten mines were seen, and many of them, especially those of iron and copper, are said to be of great richness.

IN NATURE, vol. xxvi. p. 15, will be found an illustrated description of Negretti and Zambra's patent deep-sea thermometer. This firm have now adapted their inverting thermometer for recording variations of atmospheric temperature at any desired interval of time. Twelve of such thermometers are arranged on a suitable frame in connection with a clock, a galvanic battery, and a series of small electromagnets in such manner that at every hour the galvanic circuit is completed by the clock, this releasing a detent and allowing one of the thermometers to reverse and record the temperature at that moment. In the present form of the apparatus twelve thermometers have been mounted to record hourly temperatures; this period can be easily altered to half-hours or less, or on the other hand to longer intervals, say, of two hours or more. This apparatus differs, it is claimed, from all other registering or recording thermometers in the following important particulars:—1. The thermometers contain only mercury, without any admixture of alcohol or other fluid. 2. They have neither indices or springs, the registrations being by the column of mercury itself. 3. These thermometers may be carried in any position, and cannot be disarranged except by actual breakage. 4. They will record exact temperature at any given hour of the day or night.

THE Berlin Academy of Sciences has granted the following amounts from its Humboldt Fund: 5000 marks (250*l.*) to Dr. Otto Finch, for working at the collection he made during his journey in Polynesia; 6000 marks (300*l.*) to Dr. Ed. Arning (Breslau) for researches on the leprosy epidemic in the Sandwich Islands; the same amount to Dr. Paul Güssfeldt to enable him to continue and extend his exploring tour in the Andes of Chili.

THE Anthropological Museum of Leipzig has been presented with an annual grant of 6000 marks (300*l.*) from the Grasse Fund by the town authorities.

THE sixty-sixth meeting of the Swiss Natural History Society will take place at Zürich on August 6 to 9 next.

THE German Society of Analytical Chemists met at Berlin on June 16–18 last; the most important transaction at the meeting was the adoption of certain uniform methods in the analysis of wines.

THE 27th of June last seems to have been remarkable for earthquakes in various parts of Europe. At Corfu a violent shock was felt at 11.25 a.m. on that day, and at Darmstadt a moderate shock was observed at 11.18 a.m. At the last locality three other shocks occurred in the night following, and a number of oscillations on June 28 at 11.38 p.m. On July 6 at 3.20 a.m. Constantinople and its environs were visited by an earthquake.

IN Sardinia phylloxera is ravaging the vineyards to such an extent that the inhabitants are beginning to despair of being able to overcome the plague.

THE half-yearly general meeting of the Scottish Meteorological Society is to be held in Edinburgh to-day. The business will be—(1) Report from the Council of the Society; (2) The Meteorology of Ben Nevis, by Mr. Alexander Buchan, Secretary.

W. H. EDWARDS announces, according to *Science*, that he will not, at present, complete the synopsis of species commenced in the tenth part of his "Butterflies of North America," but substitute for it a mere list of species, which will be issued with the next (concluding) part of the second series.

THE municipality of Algiers has established a chemical office, on the pattern of the similar Parisian institute, for analysing alimentary substances and discovering adulterations.

AT the last sitting of the French Société d'Hygiène M. Marie Davy, who was in the chair, gave an account of the results of his analysis of the water of the Seine; he found that the impurity is five hundred times greater below Asnieres than at Paris.

THE April number of the *Chrysanthemum* magazine of Yokohama contains a continuation of Capt. Blakiston's notes on Japanese ornithology; also an article by Mr. Eastlake on the ornithology of Hong Kong, and the continuation of a history of Japanese keramics by Capt. Brinkley. The numerous possessors of pieces of "real old Satsuma" in England will hear with annoyance from this skilled authority that large quantities of

Kioto ware have been fraudulently placed on the Western markets as genuine Satsuma. The former is less dense than the latter, and its colour is as a rule darker. In truth, this writer says, not more than a fraction of the ware which has been attributed to the Satsuma workshops was ever manufactured there. The outcome of the factories was always comparatively small. They worked to order, and nine-tenths of their productions were cups, tea-jars, and other small articles. Large vases and portly incense-burners were exceptional; and in the matter of old Satsuma Western collectors have among Japanese *virtuosi* rivals who are at once more competent judges and very much more liberal purchasers than themselves.

The city of Rouen is to establish at Pont de l'Arche on the Seine large waterworks for the generation of the electric light. A lamp is to be placed on the top of the Cathedral, and directed by a reflector on the surrounding streets.

The largest display of electric light in Paris is probably at the Hippodrome, where, in the large hall, sixteen regulators and 142 Jablochkoff lights are used, exclusive of those in other parts of the building and outside. The dimensions of the arena are about 45 metres by 120, and the height about 30 metres. The effect is really splendid.

The past month has brought with it its annual science examinations, and we have been especially struck with the questions of the City and Guilds examination papers in the electrical subjects. One fact that we notice is that there seems very little difference between the pass and honours grades, two or three of the questions being similar, if not identical in each; secondly, in the electric lighting and transmission of power papers there seems to be a great paucity of questions on these topics, and one or two rather prominent questions on theoretical electricity. Are not papers of this kind somewhat misleading to teachers who are preparing classes for these subjects?

A very interesting legal case has just been decided by the Solicitor-General in the matter of the Lane-Fox disclaimer. Mr. Lane-Fox sought to be allowed to disclaim from his patent of 1878 for incandescent lamps and storage batteries, all except the use of secondary batteries as a means of storage, and regulation of a supply of electricity. This is a very broad claim, and, to judge by present appearances, of vast importance. Although not the first to use accumulators, yet Mr. Lane-Fox is the first man who worked out a system in which they played the part of regulators for a steady supply. The disclaimer was allowed by the Solicitor-General after a protracted discussion.

Another so-called "God's waggon" has been discovered in the Deibjerger Moor near Ringkjöbing (Jutland). Our readers will remember our reporting the discovery of the first some two years ago. Dr. Petersen, the keeper of the Copenhagen Museum, has proceeded to the spot to superintend further researches.

Two further volumes of Hartleben's "Elektrotechnische Bibliothek" have just been published. They are entitled "Die elektrischen Leitungen und ihre Anlage," by J. Zacharias, and "Die elektrischen Uhren und die electrische Feuerwehr Telegraphie," by Dr. A. Tobler.

Of the "Encyclopädie der Naturwissenschaften" (Breslau, Ed. Trewendt) we have received the 14th part of the second division and the 33rd part of the first division. The latter contains the continuation of Wittstein's "Handwörterbuch der Pharmakognosie der Pflanzenreichs," and the former of Dr. Gobel's "Vergeleichender Entwicklungsgeschichte der Pflanzenorgane" in the "Handbuch der Botanik." Both works will, we are informed, be soon brought to a conclusion.

Dr. Macgowan of Wenchow is endeavouring to procure records of earthquakes in China from the residents in various parts of that country, and with that object has addressed a letter to the local journals. He directs attention especially to Formosa, where earthquakes are most common in November and December, confirming so far Mr. Mallet's observations. A Chinese record thus describes the effects produced on the sea by submarine causes—among them probably earthquakes:—"Peculiar noises of the sea are sometimes heard which are commonly regarded as indicative of change of weather, sounds coming from the foreboding rain, those from the south being followed by wind. Hissing noises are heard; at times they are low, at others loud. When low they resemble the beating of a drum or the dropping of beans on the same instrument. Now the sounds are near, and now distant; stopping suddenly, or continuing for hours. When the noise is loud, it is more noisy than a hundred thousand men, and the sea bubbles up; in very protracted cases the noises continue day and night for half a month, and when of short continuance the sound lasts three or four days. During the sounds the sea is agitated by fearful billows and furious waves."

Severe tornadoes are reported as having occurred in Southern Minnesota and Wisconsin (U.S.) on Monday. A railway train was overturned and many of the passengers killed.

Dr. H. Reusch, who last year took part in the geological investigations of the west coast of Norway, made under the direction of Prof. Kjerulf, has given to *Naturen* the results of his examination of the fossils of the fjelds and islands near Bergen. The richest find was discovered on the little island, Stordö, outside the Hardangerfjord, where numerous well preserved remains of crinoids, a great variety of corals, graptolites and shells of mollusks were obtained which belonged to the Silurian period. The rocks of this district were mostly of compressed conglomerates. The small group of islands beyond Espevær, and the neighbouring Siggen Fjeld, exhibit the most strongly marked volcanic character, and owe their origin to the eruption of streams of molten rock and layers of ash and scoriæ, which probably belong to the Silurian age. These products of eruption have, however, not remained *in situ*, for the once horizontal deposits have been so powerfully crushed, twisted, or upheaved at various points, that the masses of rock of which the great Siggen Fjeld is composed have now a vertical inclination trending north. The accidental discovery in 1862 of a small nugget of pure gold embedded in white quartz, in the so-called Storhaugens mine on Bömmel Island, has attracted the attention of prospectors, and a French company has opened extensive works at Viksnes, where copper pyrites are found in considerable quantities. A fine specimen of the auriferous quartz of Bömmel Island may be seen in the museum of the Christiania University.

The steamer *Germania* is on the point of sailing from Hamburg to Cumberland Sound, in order to bring home the staff of the German Polar station. Dr. F. Boas leaves with the *Germania* for the purpose of making ethnographical researches in Arctic America.

The additions to the Zoological Society's Gardens during the past week include a Malbrouck Monkey (*Cercopithecus cynosurus* ♂) from West Africa, presented by Miss M. A. Waite; a Black-backed Jackal (*Canis mesomelas* ♀) from South Africa, presented by Mr. E. D. Thomas; a Philantomba Antelope (*Cephalophus maxwelli*), a Duyker-Bok (*Cephalophus mergens*) from South Africa, presented by Mrs. Macfarlane; five Martinican Doves (*Zenaida martinicana*), two Porto Rico Pigeons (*Columba corensis*) from the West Indies, presented by Mr. J. A Ward; a Ringed-necked Parrakeet (*Palæornis torquatus*) from India, presented by Mrs. Humphrey; a Macaque Monkey (*Macacus cynomolgus* ♀) from India, an Ocelot ((*Felis pardalis* ♂) from Demerara, a St. Thomas's Conure (*Conurus xantholæmus*) from St. Thomas, West Indies, deposited; thirteen Common Vipers (*Vipera berus*) from Hampshire, purchased; two Levaillant's Cynictis (*Cynictis penicillata*), two Wonga-Wonga Pigeons (*Leucosarcia picata*), bred in the Gardens.